

## CLAIMS

What is claimed is:

1. A method for classifying, identifying or verifying an object comprising the computer implemented steps of:
  - 5           representing an object by a respective sequence of vectors;  
          modeling the sequence of vectors with a respective generative model such that the object is represented by the generative model; and  
          using the generative model, classifying, identifying or verifying the object.
- 10   2. The method of claim 1, wherein the step of classifying further includes the steps of :
  - calculating a distance from the respective generative model to any other generative models based on a distance metric; and  
15        using the calculated distance to classify, identify or verify the object.
- 20   3. The method of claim 2, wherein the distance metric includes any one of Kullback-Leibler type distances and Arithmetic-Harmonic Sphericity distance.
- 25   4. The method of Claim 2 wherein the distance metric follows the properties of:
  - (a) distance of an object to itself is zero, and  
          b) distance of an object to any other object is larger than or equal to zero.
- 30   5. The method of claim 1, wherein the object is any one or combination of audio signals, speech signals, image data, video data, multimedia, facial data, DNA representations, electro-cardiology signals and genetic data and derivatives of any said signals or data.
6. The method of claim 1, wherein the respective generative model is a probabilistic distribution model.

7. The method of claim 6, wherein the probabilistic distribution model employs a probability density function.
- 5 8. The method of Claim 6 wherein the probabilistic distribution model includes any one or combination of a diagonal covariance Gaussian Mixture Model, a full covariance Gaussian Mixture Model, and a Hidden Markov Model.
9. The method of claim 1, wherein at least the step of classifying is supported  
10 by one of a Support Vector Machine, a Neural Network, a Boosting Classifier or other discriminative classifier.
10. An object determination system, comprising:  
a representation module for representing an object by a respective  
15 sequence of vectors;  
a modeling module for effectively replacing the sequence of vectors with a respective generative model such that the object is represented by the generative model; and  
a determination module for classifying, identifying or verifying the  
20 object based on the generative model.
11. The object determination system of claim 10, wherein the determination module further calculates a distance from the respective generative model to any other generative model based on a distance metric and uses the  
25 calculated distance to classify, identify or verify the object.
12. The object determination system of claim 11, wherein the distance metric includes at least one of Kullback-Leibler divergence and Arithmetic-Harmonic Sphericity distance.  
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13. The object determination system of claim 11 wherein the distance metric follows the properties of :

a) distance of an object to itself is zero, and

b) distance of an object to any other object is larger than or equal to zero.

- 5     14.     The object determination system of claim 10, wherein the object is any one or combination of audio signals, speech signals, image data, video data, multimedia, facial data, electro-cardiology signals, DNA sequences, and genetic data and derivatives of any said signals or data.
- 10    15.     The object determination system of claim 10, wherein the respective generative model is a probabilistic distribution model or utilizes a probability density function.
- 15    16.     The object determination system of claim 15, wherein the probabilistic distribution model includes any of a diagonal covariance Gaussian Mixture Model, a full covariance Gaussian Mixture Model, and a Hidden Markov Model.
- 20    17.     The object determination system of claim 10, wherein the object determination system includes any of a Support Vector Machine, a Neural Network, a Boosting Classifier or other discriminative classifier.
- 25    18.     An object determination system, comprising:  
             means for representing an object by a respective sequence of vectors;  
             means for modeling the sequence of vectors with a respective generative model; and  
             means for determining class, identity or veracity of the object based on the generative model.
- 30    19.     An object determination system as claimed in claim 18 wherein the respective generative model is a probabilistic distribution model or utilizes a probability density function.

20. An object determination system as claimed in claim 18 wherein:
- the means for determining calculates a distance from the respective generative model to any other generative model based on a distance metric
- 5 and uses the calculated distance to classify, identify or verify the object; and
- the object is any one or combination of audio signals, speech signals, image data, video data, multimedia, facial data, electro-cardiology signals, DNA sequences, and genetic data and derivatives of any said signals or data.